**CSCI 1301 Lecture 2**

Key points of this lecture:  
1- Overview of Java programming language.  
2- Fundamentals of Program developmen.  
3- Compilation and Error Types.  
  
  
Java programming language  
Any programming language, such as Java, is a group of specific words and symbols defined and provided their exact meanings and functions by set of rules. The words and symbols, governed by the language rules, are put together to construct programming statements. Programming statements will deliver the instructions when the program is executed.  
Java is an object oriented programming language. Java is a case sensitive programming language. It is accompanied by a powerful and useful library. Java library is a group of java programs, classes and methods, which are available for programmers to use. This is referred to as Java API or Java Application Programmer Interface. It is also known as the Java standard class library. Importing the relevant classes from Java API enables programmers to include powerful features in their software such as graphics, database connectivity, or network communications.  
Java programs are either applications or applets. Java applets are java programs that can be loaded to HTML page to be used by Java enabled web browsers. Java applications are standalone programs that run on the computer using Java Virtual Machine (JVM).   
Java programs must have at least one class. The class must have a name. The class name is decided by the programmer. However, the class name must follow the identifier’s rules. It is also recommended to follow the naming conventions. The naming convention for class names is to have the first letter capital or uppercase (e.g. Student, Book, or Account). It is also recommended to use class names that are relevant to its purpose. All Java application programs must have one and only one main method, which is where processing begins.  
Comments are used to document and explain the code. Professional programmers always add comments when create new programs or when change, modify, or add to any existing code. Use the “//” to add one line comment or inline comment following the code (after the semicolon “;”). Use “/\*” and “\*/” to add a block of comments.  
Any opening curly brace “{“, “(“, and “[“must have a corresponding closing one.  
Each Java statement must end with “;”.  
Identifiers are all the words used when writing a java program. There are three types of identifiers:  
1- Reserved words.  
2- Words imported from the Java API, created by other programmers.  
3- Our own words.  
Reserved words are part of the Java language. They have a specific meaning or purpose and they can’t be used for any other meaning or purpose. Reserved words are always in lower case.  
When a programmer creates an identifier, programmer must follow the language rules. Identifiers may contain any letter (uppercase or lowercase), any digit (0 to 9), underscore “\_”, and dollar sign “$”. Identifiers can’t start with digit.   
White spaces are used to separate words and symbols. Additional white spaces or tabs may be used to emphasize parts of the code or enhance readability. Except for the white spaces used to separate words and symbols, any white space will be ignored by the compiler and will not affect the execution of the Java program.  
Program development: there are four groups of programming languages.  
1- Machine language.  
2- Assembly language.  
3- High-level languages.  
4- Fourth-generation languages.  
Machine language is expressed in binary code and it is specific to the CPU type. Each CPU has its own machine language. It is very difficult for humans to read. Each machine language instruction is to accomplish a simple task.  
Assembly language was created to solve the problems, limitations and difficulties of machine language. Its instructions are made of short English-like words that represent commands or data. It was an improvement from machine language because it is easier for programmers to read words than binary digits. However, assembly language can’t be executed on the computer. It must first be translated into machine language. Also because every assembly language instruction corresponds to machine language instruction, assembly language was still tedious to use. Both languages are considered to be low-level languages.   
High-level programming languages are used today by most programmers. It is expressed by English-like phrases. It is easier to read and write. A single high-level programming language statement can accomplish the equivalent of hundreds of machine language instructions. Java is a high-level programming language. High-level language is more intuitive and readable. However, it is still must be translated to machine language to be executed.  
Editors, Compilers, and Interpreters  
Development Environments are available to help programmers develop a computer program.  
Syntax is representing the rules of the programming language. Each programming language has its own syntax.  
Semantics represents the meaning of a programming statement.  
Errors are grouped into three main types:  
1- Compile-time error.  
2- Run-time error.  
3- Logical error.  
More reading: Object Oriented Programming, Problem Solving Process, OO Principles.